Attachment A

March 5, 2013

City of Rockville – Retirement Plan Design Study – Draft Findings

Presented by:

Craig Graby, EA, MAAA
Hay Group, Inc.
4301 N. Fairfax Drive, Suite 600
Arlington, VA 22203
P: 703.841.3100
F: 703.841.3113

Contents

Executive Summary

The City of Rockville, Maryland (the City) has engaged Hay Group to provide an analysis of its retirement program, including a comparison of the City's retirement program to retirement programs in surrounding governmental jurisdictions, and an analysis of various options available to the City Council in order for the City to provide a fair retirement for its employees, in the context of what other governmental units provide and the affordability – both short-term and long-term – of such benefits. Our analysis also must be sensitive to the retirement needs of the City's employees and to the treatment of various groups of employees.

The following table provides a quick summary of the types of plan changes that we looked at.

Summary of Current and Possible Alternative Plan Designs								
	Union and Administrative				Police			
	Defined Benefit		Defined Contribution		Defined Benefit		Defined Contribution	
	Accrual	Employee	Employer	Employee	Accrual	Employee	Employer	Employee
Current Plan	1% or 1.2%	0% or 1%	2.50%	5.00%	2.25%	8.50%	-	-
Alternative 1	0.50%	-	4.00%	5.00%	1.25%	4.75%	4.00%	4.00%
Alternative 2	-	-	5.50%	5.00%	-	-	9.00%	5.00%
Alternative 3	-	-	7.00%	5.00%	-	-	12.00%	5.00%

Under Alternatives 1 and 2, only new hires are added to the Alternative Plan. Under Alternative 3, the Current Plan is frozen for all current members and current members and new hires both enter a Defined Contribution Plan.

This is a sample of the possible combinations of Defined Benefit, Defined Contribution, and Employee Contributions that could be looked at. If a new plan is adopted, then that plan should weigh the City's resources with the retirement needs of its employees.

The version of the report is a working draft. The executive summary will be expanded based upon discussions with the Mayor and Council. It will reflect any changes that the may come out of that presentation.

Introduction

The City of Rockville retained Hay Group to:

- Provide a prevalence data on retirement plan designs offered to new hires by a representative survey of governmental employers.
- Prepare projections for the normal cost of the current Defined Benefit Plan continuing unchanged and compare those to the normal cost projections of: (a) a hybrid plan for future accruals, (b) closing the Defined Benefit Plan to new hires, with new hires participating only in a Defined Contribution Plan, and (c) freezing the Defined Benefit Plan and providing only a defined contribution plan to all members.
- Prepare illustrative income replacement at retirement examples for typical categories of employee at retirement.

In conjunction with the above analyses, Hay Group has been charged with providing 20-year normal cost projections under the following scenarios:

- Retaining the current Defined Benefit Plan and Defined Contribution Plan arrangement for General employees and Defined Benefit Plan only for current Police employees
- A hybrid arrangement with both a Defined Benefit Plan and a Defined Contribution Plan component for both General and Police employees
- Closing the current Defined Benefit Plan to new hires and providing new hires with only a Defined Contribution Plan
- Freezing the Defined Benefit Plan and providing all City employees with benefits through a Defined Contribution Plan

Hay Group was also charged with providing income replacement ratios for a variety of employees under the current plan and the three alternative plan designs listed above.

The City made changes to the plans for General employees around 1986 that moved the Plan from exclusively Defined Benefit to a combination of Defined Benefit and Defined Contribution. This is the type of plan that many governmental plans are now considering for new hires. Around the same time the City made this move, the federal government made a similar move for federal employees. The Civil Service Retirement System provided benefits to federal employees through a Defined Benefit Plan only. Effective January 1, 1987 federal employees were covered by a hybrid arrangement that provided a 1.0% to 1.1% accrual from the Defined Benefit Plan (the Federal Employees' Retirement System) and up to a 5% employer match to a Defined Contribution Plan (the Thrift Savings Plan). Certain federal Law Enforcement earn higher accruals of 1.7% per year.

At this point, few governments have moved to exclusively Defined Contribution Plans for new entrants, but there seems to be more of a trend in that direction. At the state level, Utah has moved to a Defined Contribution and others, like Pennsylvania, are actively exploring the move. At the local level, Gaithersburg, MD has moved to a series of Defined Contribution Plans for both their General and Law Enforcement employees.

Current Retirement Program

The City offers its employees differing retirement programs, depending on whether or not they are represented by a union. Highlights of these retirement programs are provided below.

Plan Eligibility		
	Defined Benefit Option	DB Plus Thrift Plan Option
Administrative Personnel	Hired prior to 4/15/1986 and elected not to transfer to Thrift Plan	Hired prior to 4/15/1986 and elected to transfer from Defined Benefit Option or hired on or after 4/15/1986
Union Employees	Hired prior to 12/02/1986 and elected not to transfer to Thrift Plan	Hired prior to 12/02/1986 and elected to transfer from Defined Benefit Option or hired on or after 12/02/1986
Police Employees	All Police employees are eligible for the Defined Benefit Option only	N/A

Normal Retirement Benefit		
Form	All employees will receive a monthly annuity guaranteed for ten years and life thereafter. Optional forms may be elected in advance of retirement	
	Defined Benefit Option	DB Plus Thrift Plan Option
Administrative Personnel and Union Employees	Attained at age 60	Hired prior to July 1, 2011: Attained at age 60 Hired on or after July 1, 2011: Attained age 65 and 10 years of credited service
Police	Earlier of attained age 60 or 25 years of service	N/A

Normal Retirement Benefit		
Amount (accrued benefit)	**Defined Benefit Option**	**DB Plus Thrift Plan Option**
Definition of "Earnings"	Earnings determined at an employee's basic rate of pay, excluding overtime payments, commissions, bonuses, and any other additional compensation, but including longevity pay.	
"Final Average Earnings"	Administrative Personnel and Union Employees. Average annual earnings during the 36 consecutive months of the last 120 months of City employment (or, if shorter, the employee's actual period of employment) which produce the highest average. Police. Average annual earnings during the final 60 months (or, if shorter, the employee's actual period of employment) of City employment.	
Union Employees		The sum of (i), (ii), and (iii) (i) 1.8% of average earnings times credited service prior to 1/01/1987 (ii) 1.0% of average earnings times credited service after 12/31/1986 (iii) Actuarial equivalent of a lump sum payment of members Thrift Plan Option vested account balance. Member may elect a cash distribution or combination of cash and annuity
Administrative Personnel	The sum of (i) and (ii) (i) 1.8 % of average earnings times credited service prior to 4/01/1996 (ii) 2.0% of average earnings times credited service on or after 4/01/1996	The sum of (i), (ii), and (iii) (i) 1.8% of average earnings times credited service prior to 4/01/1986 (ii) 1.0% of average earnings times credited service after 4/01/1986 and prior to 4/01/1996 (iii) 1.2% of average earnings times credited service on or after 4/01/1996

Normal Retirement Benefit		
Amount (accrued benefit)	**Defined Benefit Option**	**DB Plus Thrift Plan Option**
		Actuarial equivalent of a lump sum payment of members Thrift Plan Option vested account balance. Member may elect a cash distribution or combination of cash and annuity
Police Employees	The lesser of (i) and (ii): (i) 2.0% of average earnings times credited service up to 4/01/2004, plus (ii) 2.25% of average earnings times credited service on or after 4/01/2004 67.5% of average earnings	

Early Retirement Benefit	
Age	Hired prior to July 1, 2011: Attained age 50 Hired on or after July 1, 2011: Attained age 58
Service	Ten years of credited service
Form	Same as normal retirement benefit
Amount	Accrued benefit on early retirement date reduced to reflect that payments begin prior to normal retirement date
Reduction Factors:	
Administrative Personnel and Union Employees	Hired prior to July 1, 2011: 1/4 of 1% for each month the benefit commences prior to normal retirement date. Hired on or after July 1, 2011: 3/8 of 1% for each month the benefit commences prior to normal retirement date.
Police	6/10 of 1% for each month during the first sixty months and 3/10 of 1% for each month during the next sixty months the benefit commences prior to normal retirement date

Contributions		
	Defined Benefit Option	**DB Plus Thrift Plan Option**
Union	4.2% of earnings plus 1/2 the excess (if any) of the City's contribution over 6.5% of earnings	1%, 2%, 3%, 4%, or 5% of earnings
Administrative Personnel	5.2% of earnings plus 1/2 the excess (if any) of the City's contribution over 6.5% of earnings	1.0% of earnings will be contributed to the Defined Benefit portion 1%, 2%, 3%, 4%, or 5% of earnings will be contributed to the Thrift Plan portion
Police	8.5% of earnings	N/A
City	Remaining cost of plan	50 cents for each $1.00 contributed by member. (Applies to Administrative Personnel and Union employees only.)
Interest on Employee Contributions	6.0% per year	In accordance with the terms of the investment contract

Cost of Living adjustment

There is no cost-of-living increase for the April 1, 2012 valuation. Historically, there have been cost-of-living increases given to current retirees. There have been no cost-of-living increases since January 1, 2008.

Benchmarking Retirement Benefits

To compare the City's retirement program with that of other Maryland jurisdictions, we examined the defined benefit retirement programs of 12 other jurisdictions, including Montgomery County, Baltimore City and the State of Maryland. We have separated our analysis of retirement plans for General employees and for Law Enforcement employees.

General Employees Retirement Programs

As you might expect, retirement programs of surrounding jurisdictions have been evolving of late, with the trend clearly toward reducing costs by providing less generous benefits. For example, effective July 1, 2011 the State of Maryland retirement plan changed its accrual formula multiplier from 1.8 percent to 1.5 percent for employees hired on or after July 1, 2011.

Many features of the surveyed plans are similar (e.g., calculation of final average pay and various benefit options), but we found four key distinguishing plan elements in the surveyed defined benefit plans that have a significant impact on the amount of the pension provided and the cost of those pensions. They are:

- The multiplier, which is the percentage used in the typical formula: multiplier percentage times years of service times final average compensation.
- The requirements for an unreduced normal retirement date. Eligibility for a full, unreduced pension at an age earlier than age 65 can provide a pension that is considerably more valuable than the same benefit commencing at age 65. Each year that a normal retirement pension can commence before age 65 is worth more because it will be paid longer if the member commences benefits at an earlier age than 65.
- The employee contribution, which directly reduces the employer's funding obligation.
- Cost-of-living adjustments (COLAs). COLAs vary by: whether they are automatic or ad hoc; the minimum and maximum COLA, and how the COLA is calculated.

Each of these elements has a significant impact on the value of pensions provided and the cost. There is no easy way to evaluate the impact of the combination of these elements.

Multiplier (e.g., 1% of final average pay)
The City's accrual rates of 1.0% for unionized employees and 1.2% for administrative employees is relatively low, compared with the most prevalent multipliers in the range of 1.6%. Multipliers for the group of the surveyed jurisdictions ranged from a low in Prince George's County with .8% for pay up to the Social Security integration level, with 1.5% for pay in excess of that level, to a high of 2% for Washington, Wicomico and Anne Arundel Counties. In general, the City's multiplier is among the lowest among the jurisdictions surveys. This is

mainly due to the hybrid nature of the plan and the City's match of up to 2.5% in the Thrift Plan (when the employee contributes the full 5.0%).

Normal Retirement Date
The prevailing normal retirement date (i.e., the date at which an employee can retire with a full, unreduced pension) is the earlier of 30 years of service or age 62 with 5 years of service. Relative to the other surveyed jurisdictions, the City's normal retirement date of age 65 with 10 years of service, is later than many other jurisdictions. Normal retirement dates range from as early as 25 years of service to as late as age 67 with 10 years of service. We note that the State of Maryland and Prince George's County have adopted a normal retirement date, which is the earlier of rule of 90 (the sum of age and years of service equals 90) or age 65 with 10 years of service. A majority of plans require only 5 years of service, rather than the City's 10-year requirement.[1]

Employee Contributions
In the vast majority of plans we surveyed, employee contributions defray plan costs and do not augment the employee's pension benefit. Most of plans require employee contributions, and most employee contributions are in the 3-6% range, with some plans requiring as much as 7% employee contributions. Most employee contributions are a fixed percentage of pensionable earnings. We are not aware of any defined benefit plan in which additional employee contributions are permitted but not required.

COLAs
Automatic COLAs are provided in a slight majority of the defined benefit plans surveyed (11 of 17). As we have noted among governmental pension plans around the country, there is a growing trend in curtailing automatic COLAs. Although not a large issue during this period of low inflation, automatic COLAs have the potential for adding significant cost to plans. Because the City does not provide automatic COLAs, it remains in complete control of this aspect of plan cost.

In the aggregate the City's key pension elements discussed above tend to be on the more conservative side due to the hybrid nature of the plan.

[1] The IRS takes the position that a plan for general employees must have a normal retirement age of not earlier than age 62 (regardless of years of service), unless the plan sponsor can demonstrate that an earlier normal retirement date is typical for plans covering similar categories of employees.

Police and Public Safety Retirement Programs

Like pension plans for general employees, the key distinguishing factors in police and public safety plans are the same four elements noted above, as discussed below.

Multiplier

The most prevalent multiplier for police plans is in the range of 2.4% - 2.5%. Of the plans surveyed, Gaithersburg has the only defined contribution plan for police, with an 8% employer contribution plus up to a 3% match plus the possibility of an additional 5% supplemental contribution for a total of up to 16%. Multipliers range from a low of 1.9% to a high of 3% for the first 20 years of service.

Normal Retirement Date

Normal retirement dates for police plans are, as a rule, lower than for general employee plans. The most common normal retirement date is either age 55 or 60 with 5 years of service. Often, the plan's normal retirement date is the earlier of 25 or 30 years of service, or age 55 with 5 years of service. The City's normal retirement date is in line with the normal range of normal retirement dates among other police plans.

Employee Contributions

Employee contributions for police plans are typically in the 8% - 9% range, with 8% being the most common employee contribution rate. Employee contributions range from a low of 5.625% (Wicomico County) to a high of 11.6% (Howard County).

COLAs

Fifteen of the 19 surveyed defined benefit plans provide some type of automatic COLA. Some plans tie the COLAs to the plan's investment performance (Prince George's County and the State of Maryland). Most COLAs are dependent on the increase in the Consumer Price Index (CPI). Montgomery County bifurcated its COLA so that effective July 1, 2011, the COLA is capped at 2.5% for service on and after that date.

In the aggregate the City's key pension elements discussed above tend to be on the more conservative side.

Alternative Retirement Program Designs for the City

The City has requested that Hay Group provide alternative retirement program designs that the City may consider for both General employees and the Police employees. The three alternatives presented below are designed to reduce the City's retirement program cost, reduce the cash and expense volatility, reduce the City's exposure to investment market volatility, strike a reasonable balance between the City's interests and the goal of providing City employees with a solid base of retirement income that in conjunction with Social Security and other personal savings would allow a hypothetical career City employee to enjoy a reasonable standard of living retirement when compared with the compensation provided to that employee.

We have provided three alternative designs for the City to consider, realizing that there are an infinite number of variations on these three basic approaches. We present these base alternatives to assist the City in evaluating which approach is most compatible with the City's resources and total compensation policy. We would anticipate that following an initial discussion of this Report and these alternatives, we would provide the City with additional alternatives that are consistent with the City's policies and goals.

Alternative Design 1

Under Alternative 1, new hires would enter into a Hybrid Alternative Plan.

- **General employees** would be provided with future defined benefit plan accruals of 0.5% of final average pay times years of service, plus a City contribution of 4.0% of each covered employee's base pay to the Hybrid Alternative Plan.
- **Police employees** would be provided with future defined benefit plan accruals of 1.25% of final average pay time years of future service, plus a City contribution of 4.0% of each covered employee's base pay to the Hybrid Alternative Plan. Police employee contributions to the Defined Benefit portion of the Hybrid Alternative Plan would be proportionately reduced from 8.50% to 4.75% and the employee would be required to contribute 4.0% to get the employer match.

Alternative Design 1 would maintain the City's defined benefit plan with reduced future accruals and with increased defined contribution amounts as a partial offset for the reduced accrual rate. This retains the City's obligation to provide a lifetime annuity for all employees that essentially provides a level of protection and insurance against volatility in investment markets both during the build-up period (while the employee is working) and during the period of retirement. It also reduces the volatility and unpredictability of the City's financial obligation to fund the defined benefit plan, and thereby shifts some, but not all of the risk, to the individual employees as they make their own investment decisions with respect to their defined contribution accounts. As indicated in the replacement values provided later in this Report, the likelihood that an employee would not be any worse off than under the City's current retirement program depends entirely upon the success the employee has in investing his or her defined contribution account. More conservative investment strategies will tend to lock in smaller retirement benefits, while more aggressive strategies, with corresponding higher risks, could provide retirement benefits that could exceed those provided through the City's current program, depending on a number of variables, most important of which is the employee's age.

Defined Benefit plans are vastly more valuable – and more expensive for employers – than Defined Contribution Plans for older employees. The older the employee the more valuable the Defined Benefit Plan and the higher a Defined Contribution would need to be to provide an annuity value equal to the defined benefit plan. For this and other reasons, shifting the emphasis from a defined benefit plan to a defined contribution plan will always create "winners" and "losers."

As a general matter younger employees tend to be winners in the shift toward Defined Contribution plans because, at least in theory, contributions to their investment accounts have a longer time to reap the benefit of compounding investment returns. Of course, conservative, lower risk, investment strategies will dampen the growth potential for those investment returns. But, in short, the shift to defined contribution retirement strategies reduces the burdens and risks on employers and shifts them to the employee, regardless of the employee's age.

The cost impact for Alternative Design 1 is presented below. The current plan costs are based on the Normal Cost plus the employer contribution to the Thrift Plan for General employees and on the Normal Cost for Police employees. The Normal Cost levels shown in the current cost column will differ slightly from the values shown in the report because they include an adjustment for new hires.

Savings / (Cost) of Moving New City of Rockville Employees To a Hybrid Alternative Plan (Alternative 1)						
Fiscal Year	General Plan			Police Plan		
	Current Plan Costs	Alternative 1 Costs	Savings / (Cost)	Current Plan Costs	Alternative 1 Costs	Savings / (Cost)
2014	2,040,669	2,029,405	11,264	250,484	249,461	1,023
2015	2,128,950	2,111,982	16,967	269,289	267,803	1,486
2016	2,223,141	2,200,222	22,919	289,316	287,329	1,987
2017	2,323,080	2,293,871	29,209	310,353	307,855	2,497
2018	2,430,649	2,395,015	35,633	332,872	329,810	3,061
2019	2,545,145	2,502,775	42,370	356,658	353,007	3,651
2020	2,666,496	2,617,022	49,474	381,763	377,499	4,264
2021	2,794,765	2,737,707	57,057	408,598	403,660	4,938
2022	2,931,239	2,866,218	65,022	437,278	431,601	5,677
2023	3,075,565	3,002,052	73,513	467,727	461,262	6,465
2024	3,228,283	3,145,731	82,552	500,470	493,119	7,351
2025	3,390,172	3,298,039	92,133	535,232	526,936	8,296
2026	3,562,100	3,459,859	102,241	572,364	563,037	9,327
2027	3,745,254	3,632,431	112,823	612,025	601,573	10,452
2028	3,940,073	3,816,131	123,942	653,579	641,986	11,593
2029	4,147,207	4,011,570	135,637	698,201	685,337	12,864
2030	4,369,115	4,221,422	147,692	745,524	731,310	14,213
2031	4,607,071	4,446,997	160,073	795,691	780,047	15,644
2032	4,860,157	4,687,084	173,073	848,856	831,696	17,160
2033	5,127,029	4,939,973	187,056	905,536	886,735	18,801
Totals	66,136,160	64,415,506	1,720,650	10,371,816	10,211,063	160,750

Alternative Design 2

Under Alternative 2, new hires would enter into a Defined Contribution Plan.

- **General employees** would make a 5% employee contribution and the City would make a 5.5% contribution.
- **Police employees** would make a 5% employee contribution and the City would make a 9% contribution.

In this Alternative Design 2, the risks and volatility of the Defined Benefit Plan are further limited to the current population that remains in the Defined Benefit Plan. No risk would be taken on by the City for new employees. It would be expected, that the City would eventually fully fund the Defined Benefit Plan and could consider an investment strategy that would match assets with liabilities and substantially curtail any investment risk associated with the Defined Benefit Plan.

The increased contributions to the Defined Contribution Plan would not completely offset in the aggregate the elimination of future accruals under the Defined Benefit Plan. Accordingly this Alternative 2 provides greater cost savings for the City and, all other things being equal, provides a smaller benefit to employees than Alternative 1.

The cost impact for Alternative Design 2 is presented in the table below.

Savings / (Cost) of Moving New City of Rockville Employees To a New Defined Contribution Plan (Alternative 2)						
	General Plan			Police Plan		
Fiscal Year	Current Plan Costs	Alternative 2 Costs	Savings / (Cost)	Current Plan Costs	Alternative 2 Costs	Savings / (Cost)
2014	2,040,669	2,018,142	22,527	250,484	248,182	2,302
2015	2,128,950	2,095,015	33,934	269,289	265,946	3,344
2016	2,223,141	2,177,303	45,838	289,316	284,846	4,470
2017	2,323,080	2,264,662	58,418	310,353	304,734	5,618
2018	2,430,649	2,359,382	71,267	332,872	325,983	6,888
2019	2,545,145	2,460,406	84,740	356,658	348,444	8,214
2020	2,666,496	2,567,548	98,948	381,763	372,170	9,594
2021	2,794,765	2,680,650	114,115	408,598	397,488	11,110
2022	2,931,239	2,801,196	130,043	437,278	424,505	12,773
2023	3,075,565	2,928,539	147,026	467,727	453,180	14,547
2024	3,228,283	3,063,179	165,104	500,470	483,930	16,540
2025	3,390,172	3,205,906	184,266	535,232	516,567	18,665
2026	3,562,100	3,357,618	204,482	572,364	551,378	20,986
2027	3,745,254	3,519,608	225,647	612,025	588,507	23,518
2028	3,940,073	3,692,189	247,884	653,579	627,494	26,085
2029	4,147,207	3,875,932	271,274	698,201	669,257	28,944
2030	4,369,115	4,073,730	295,385	745,524	713,543	31,980
2031	4,607,071	4,286,924	320,147	795,691	760,491	35,200
2032	4,860,157	4,514,011	346,146	848,856	810,246	38,610
2033	5,127,029	4,752,916	374,113	905,536	863,234	42,302
Totals	66,136,160	62,694,856	3,441,304	10,371,816	10,010,125	361,690

Alternative Design 3

Under Alternative 3, accruals would be frozen in the Defined Benefit Plan and all members would enter into a Defined Contribution Plan.

- **General employees** would have their Defined Benefit Plan accruals frozen (i.e., no additional accruals). No additional service or salary would be included in the benefit calculation. However, service would continue to accrue for vesting and eligibility purposes. The employee would make a 5% employee contribution and the City would make a 7% contribution.
- **Police employees** would have their Defined Benefit Plan accruals frozen (i.e., no additional accruals). No additional service or salary would be included in the benefit calculation. However, service would continue to accrue for vesting and eligibility purposes. The employee would make a 5% employee contribution and the City would make a 12% contribution.

In this Alternative Design 3, the risks and volatility of the Defined Benefit Plan are further limited to those liabilities accrued prior to the date of freezing the City's defined benefit plan. This is not to say that the City will be free of any liability for the defined benefit plan; indeed, the City would have a continuing obligation to fund the Defined Benefit Plan. But the liabilities would not increase due to additional benefit accruals, and, it would be expected, that the City would eventually fully fund the plan and could consider an investment strategy that would match assets with liabilities and substantially curtailing any investment risk associated with the Defined Benefit Plan.

Due to freezing the Defined Benefit Plan, there is a sharp drop in the Unfunded Accrued Liability. This drop would be amortized over 20 years and resulted in reduction of cost of about \$1.6 million per year for the General employees and about \$550,000 per year for Police employees. These reductions are reflected in the cost savings shown for Alternative 3.

The cost impact for Alternative Design 3 is presented in the table below.

Savings / (Cost) of Freezing the DB Plan for Rockville Employees And Moving All Employees to a New Defined Contribution Plan (Alternative 3)						
	General Plan			Police Plan		
Fiscal Year	Current Plan Costs	Alternative 3 Costs	Savings / (Cost)	Current Plan Costs	Alternative 3 Costs	Savings / (Cost)
2014	2,040,669	592,690	1,447,979	250,484	-	250,484
2015	2,128,950	701,878	1,427,072	269,289	15,535	253,754
2016	2,223,141	817,945	1,405,195	289,316	39,789	249,527
2017	2,323,080	940,961	1,382,119	310,353	65,978	244,375
2018	2,430,649	1,072,373	1,358,276	332,872	93,152	239,720
2019	2,545,145	1,211,911	1,333,234	356,658	122,158	234,500
2020	2,666,496	1,359,162	1,307,334	381,763	152,943	228,820
2021	2,794,765	1,515,003	1,279,762	408,598	185,000	223,598
2022	2,931,239	1,680,538	1,250,701	437,278	218,368	218,909
2023	3,075,565	1,855,778	1,219,787	467,727	253,611	214,116
2024	3,228,283	2,041,353	1,186,930	500,470	289,762	210,708
2025	3,390,172	2,238,067	1,152,105	535,232	327,938	207,294
2026	3,562,100	2,446,804	1,115,297	572,364	367,668	204,696
2027	3,745,254	2,668,677	1,076,578	612,025	409,000	203,024
2028	3,940,073	2,904,317	1,035,756	653,579	454,075	199,505
2029	4,147,207	3,154,517	992,690	698,201	500,363	197,838
2030	4,369,115	3,421,309	947,806	745,524	549,370	196,154
2031	4,607,071	3,705,947	901,123	795,691	601,301	194,390
2032	4,860,157	4,008,239	851,918	848,856	656,382	192,474
2033	5,127,029	4,327,726	799,303	905,536	713,923	191,613
Totals	66,136,160	42,665,195	23,470,965	10,371,816	6,016,316	4,355,499

Replacement Ratios

An important comparison of the current plan to the alternatives is the level of final salary that is replaced by retirement income. The following is a comparison of the current plan to the alternative plans. Since the value of the Defined Contribution Plan will vary based on the investment return, we show replacement ratios assuming 4.25%, 5.25%, 6.25%, 7.25%, and 8.25%.

General Employee Replacement Ratios Under the Current Plan and Alternatives				
	Age/Service at Retirement			
	65/40	65/30	65/20	65/10
4.25% Investment Returns on DC Plan				
Current Plan	56.9%	43.8%	30.0%	15.5%
Alternative 1	41.8%	32.7%	22.8%	12.0%
Alternative 2	26.8%	21.6%	15.6%	8.4%
Alternative 3	31.7%	26.6%	20.0%	11.4%
5.25% Investment Returns on DC Plan				
Current Plan	60.6%	46.0%	31.1%	15.8%
Alternative 1	46.2%	35.4%	24.1%	12.3%
Alternative 2	31.9%	24.8%	17.1%	8.8%
Alternative 3	36.0%	29.2%	21.3%	11.8%
6.25% Investment Returns on DC Plan				
Current Plan	65.2%	48.7%	32.3%	16.1%
Alternative 1	51.8%	38.6%	25.5%	12.7%
Alternative 2	38.4%	28.5%	18.8%	9.3%
Alternative 3	41.4%	32.3%	22.7%	12.1%
7.25% Investment Returns on DC Plan				
Current Plan	71.2%	51.9%	33.6%	16.4%
Alternative 1	59.0%	42.4%	27.2%	13.1%
Alternative 2	46.8%	33.0%	20.7%	9.7%
Alternative 3	48.2%	35.9%	24.2%	12.5%
8.25% Investment Returns on DC Plan				
Current Plan	78.8%	55.7%	35.2%	16.7%
Alternative 1	68.1%	47.0%	29.0%	13.5%
Alternative 2	57.5%	38.3%	22.8%	10.2%
Alternative 3	56.7%	40.2%	25.9%	12.9%

Police Employee Replacement Ratios Under the Current Plan and Alternatives				
	Age/Service at Retirement			
	60/30	60/20	60/10	50/25
4.25% Investment Returns on DC Plan				
Current Plan	60.3%	40.2%	20.1%	50.2%
Alternative 1	48.2%	32.9%	16.9%	38.6%
Alternative 2	25.7%	18.5%	10.0%	18.8%
Alternative 3	30.1%	23.4%	13.8%	24.7%
5.25% Investment Returns on DC Plan				
Current Plan	60.3%	40.2%	20.1%	50.2%
Alternative 1	50.3%	33.9%	17.2%	39.9%
Alternative 2	29.4%	20.3%	10.5%	21.0%
Alternative 3	31.4%	24.0%	14.0%	25.4%
6.25% Investment Returns on DC Plan				
Current Plan	60.3%	40.2%	20.1%	50.2%
Alternative 1	52.8%	35.1%	17.5%	41.4%
Alternative 2	33.8%	22.3%	11.0%	23.6%
Alternative 3	32.7%	24.6%	14.2%	26.3%
7.25% Investment Returns on DC Plan				
Current Plan	60.3%	40.2%	20.1%	50.2%
Alternative 1	55.8%	36.3%	17.8%	43.1%
Alternative 2	39.1%	24.5%	11.5%	26.7%
Alternative 3	34.2%	25.2%	14.3%	27.1%
8.25% Investment Returns on DC Plan				
Current Plan	60.3%	40.2%	20.1%	50.2%
Alternative 1	59.5%	37.8%	18.1%	45.1%
Alternative 2	45.5%	27.0%	12.1%	30.2%
Alternative 3	35.9%	25.9%	14.5%	28.1%

The Defined Contribution balances were converted to annuities using a 5% assumed interest rate and the GAR94 unisex mortality table. Under Alternative 3, half of the career was assumed to occur under the current plans, at which point the benefit was frozen, and the second half of the career was in the Defined Contribution Plan only.

The replacement ratios shown above reflect the impact of the alternatives on employees who spend or end their career with the City. If we showed younger hires who terminated after 10 or 15 years, they would be more likely to have higher benefits under the alternatives than the sample cases shown.

In addition to the replacement ratios for the City benefits, it is also important to consider the benefit provided by Social Security. The following table presents some sample replacement ratios that an employee may receive through Social Security retirement.

Social Security Replacement Ratios

Birth Year	Year of Retirement	Wages in 2012								
		30,000	40,000	50,000	60,000	70,000	80,000	90,000	100,000	Wage Base
1947	2013	48%	44%	41%	39%	36%	33%	31%	29%	28%
1949	2015	46%	42%	39%	37%	34%	31%	29%	28%	28%
1954	2020	41%	37%	35%	33%	30%	28%	26%	26%	28%
1959	2025	37%	34%	32%	30%	27%	25%	26%	27%	28%
1963	2030	34%	32%	30%	27%	25%	25%	26%	27%	28%
1968	2035	32%	30%	28%	25%	24%	25%	26%	27%	28%

All replacement ratios assume wages grow 6% per year. For the Social Security projections, the Maximum Taxable Wage Base grows 3.5% per year, inflation is 2.75% per year, and wages in the denominator are limited to the Maximum Taxable Wage Base.

Certification

These estimates have been prepared in accordance with generally accepted actuarial principles and practices.

The results shown in this report are reasonable actuarial results. However, a different set of results could also be considered reasonable actuarial results. Thus, reasonable results differing from those presented in this report could have been developed by selecting different points for various assumptions.

The actuary certifying to this estimate is an Enrolled Actuary, and member of the American Academy of Actuaries and other professional actuarial organizations, and meets the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Appendix – Retirement Program Comparisons

The following tables are a summary of plan provisions gathered from public surveys, CAFRs, and plan documents for the counties and cities listed.

Comparison of Retirement Programs of Various Governmental Jurisdictions General Employee Plans							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
City of Rockville (Defined Benefit / Thrift Plan)	Yes	Union Defined Benefit Component: 1% x FAS x Credited Service + Actuarial equivalent of a lump sum payment of members thrift Plan Option vested account balance. Member may elect a cash distribution or combination of cash and annuity Administrative Defined Benefit Component: 1.2% x FAS x Credited Service + Actuarial equivalent of a lump sum payment of members thrift Plan Option vested account balance. Member may elect a cash distribution or combination of cash and annuity Thrift Component for Union and Admin: Employer Match of 1% to 5% based upon member election at hire. This election cannot be changed.	Base Pay	Highest consecutive 36 months of the last 120 months	Age 65 with 10 years of credited service (effective July 1, 2011)	Union Employees: 0% to the Defined Benefit and 1% to 5% of earnings to the Thrift Administrative Personnel: 1.0% of earnings to the Defined Benefit and 1% to 5% of earnings to the Thrift	Ad hoc; most recent January 1, 2008
Anne Arundel	Yes	2% x FAS x Credited Service, Maximum: 60% x FAS	Base Pay	Highest 3 of last 5 yrs	30 yrs of credited service or age 60 with 5 yrs	4%	60% CPI to a maximum of 2.5%

Comparison of Retirement Programs of Various Governmental Jurisdictions General Employee Plans							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Baltimore City	Yes	1.6% x (FAS up SS Integration Level) x Credited Service up to 30 plus 1.85% x (FAS above SS Integration Level) x Credited Service up to 30 plus 1.85%x FAS x Credited Service above 30 yrs	Base Pay	Highest 3 yrs (January 1 rates)	30 yrs of credited service or age 65 with 5 yrs	None	Minimum of 1.5% - increases depend on investment performance
Baltimore	Yes	1/70 x FAS x Credited Service (1.43% per yr)	Base Pay	Highest 36 months	35 yrs of credited service without reference to age or age 67 with 10 yrs	7%, effective 7/2011	Depends on investment performance, 1-3% max based on the CPI-U for 12 months ending in Dec. (0% if service < 20 years)
Calvert	Yes	Defined Contribution Plan - Employer contributes 5% and Employee contributes 3%	Base Pay	NA	NA	3% of pay	NA
Caroline	Yes	1.6% x FAS x Credited Service	Base Pay	Rate of pay as of first day of each month during highest consecutive 36 months	30 yrs of credited service or age 62 with 5 yrs	None	Determined annually during budget deliberations

Comparison of Retirement Programs of Various Governmental Jurisdictions General Employee Plans							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Carroll	Yes	1.6% x FAS x Credited Service (.7% x FAS x Credited Service for service before 10-01-09)	Base Pay	Highest 3 consecutive yrs	30 yrs of credited service or age 62 with 3 yrs	5%	Up to a maximum of 2%
Charles	Yes	Yrs 1-5 = 1.5% x FAS x Credited Service, Yrs 6-10 = 1.75% x FAS x Credited Service, Yrs 11 - 15 = 2.0% x FAS x Credited Service, Yrs 16 - 20 = 2.25% x FAS x Credited Service, Yrs 20+ = 2.50% x FAS x Credited Service	Base Pay	Highest 3 of last 10 yrs	Age 62 with 5 yrs of credited service or age 60 with 20 yrs	4%	100% CPI up to a max of 4%
City of Frederick	Yes	Employee can choose between the following: 30YP: 1% x FAS x Credited Service 25YP: 1.5% x FAS x Credited Service (effective 7/1/2012)	Base Pay	Highest 5 consecutive plan years out of the last 10 plan years (for both plans, effective 7/1/2012)	"Rule of 90" - Age plus credited service greater than or equal to 90 (for both plans, effective 7/1/2012)	30YP, 1% 25YP: 7.5% (effective 7/1/2012)	Based on current CPI, limited to an annual increase of 2.5% (for both plans, effective 7/1/2012)
Frederick	Yes	Hired pre - 7/1/12: 2% x FAS x Credited Service up to 30 yrs; hired on or after 7/1/2011: 1.67% x FAS x Credited Service up to 36 years and unused sick leave	Base Pay	Highest 36 consecutive months	Effective 7/1/2012, 30 years of credited service or age 65 with 10 years of service	6%	1% compounded annually

Comparison of Retirement Programs of Various Governmental Jurisdictions General Employee Plans							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
City of Gaithersburg	Yes	Defined Contribution Plan with employer contributions of 8%; plus Profit Sharing match of 3% on an Employee 5% contribution	Base Pay	N/A	5 year vesting on Money Purchase; 10 year vesting on 3% match		
Garrett	Yes	1.67% x FAS x Credited Service not to exceed 35 years	Base Pay	36 consecutive calendar months out of most recent 120 months that = the highest average	Age 62	3.3875%	Determined annually during budget deliberations
Howard	Yes	1.55% x FAS x Credited Service (some at 1.66% effective 7/1/2011)	Base Pay	Highest 36 months	Earliest of: 30 yrs of credited service, OR age 62/5 yrs, OR age 63/ 4 yrs, OR age 64/3 yrs, OR age 65/2 yrs	2% of pay (some at 3% effective 7/1/2011)	100% CPI up to a maximum of 3%

Comparison of Retirement Programs of Various Governmental Jurisdictions General Employee Plans							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Maryland-National Park and Planning Commission	Yes	Prior to Eligibility for Social Security: High-3 x 2% x C.S.; After Eligibility for full Social Security: SSCCL x 1.5% x C.S., plus difference between High-3 and SSCCL x 2% x C.S.	Base Pay	High-3	Age 60 w/ at least 5 yrs of credited service or 30 yrs of credited service	3.5% up to the Social Security Wage Base and 6.5% in excess of the Wage Base.	Portion of member's benefit attributable to service earned after 7/1/12 will be subject to a maximum COLA of 2.5%.
Montgomery	Yes	Defined Contribution Plan - Employer contributes 8% Cash Balance Plan – Employer contributes 8% with guaranteed interest rate of 7.25%	Base Pay + specific differentials; does not include overtime	N/A	Age 62	4% of pay to SS integration level and 8% of pay in excess of SS integration level	N/A

Comparison of Retirement Programs of Various Governmental Jurisdictions General Employee Plans							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Prince George's	Yes	In State Non-contributory plan 0.8% x (FAS up to SS Integration Level) x Credited Service plus 1.5% x (FAS above SS Integration Level) x Credited Service	Base Pay	3 highest yrs; New hires after 7/1/2011 - highest 60 consecutive months	Effective 7/1/2011, Rule of 90 or Age 65 with 10 yrs eligibility service	5% of pay in excess of SS Integration Level	100% CPI up to max of 3%; All employees after 7/1/2011 - 100% CPI up to a max of 2.5% if rate of return is achieved; 1% if investment target not met.
Washington	Yes	2% x Avg/Highest x Credited Service	Base Pay	Highest 3 yrs	30 yrs of credited service or age 60 with 5 yrs	5.5%	Not annual, determined during budget deliberations
Wicomico	Yes	2% x FAS x Credited Service	Base Pay	Highest 36 consecutive months.	5 yrs vested and 25 years of credited service in the plan or 5 yrs vested and Age 55, whichever comes first.	5.625%	Not annual, determined during budget deliberations

Comparison of Retirement Programs of Various Governmental Jurisdictions General Employee Plans							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
State System	Yes	1.8% x FAS x Credited Service; New hires after 7/1/2011 - multiplier is 1.5%	Base Pay	Highest 36 consecutive months; New hires after 7/1/2011 - highest 5 consecutive yrs	Effective 7/1/2011, Rule of 90 or Age 65 with 10 yrs eligibility service	7%, effective 7/1/2011	100% CPI up to max of 3%; All employees after 7/1/2011 - 100% CPI up to a max of 2.5% if rate of return is achieved; 1% if investment target not met

Comparison of Retirement Programs of Various Governmental Jurisdictions Law Enforcement							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
City of Rockville (Defined Benefit Plan)	Yes	2.25% x FAS x Credited Service; Maximum of 67.5% of FAS	Base Pay	Final 5 years	25 years of credited service or age 60	8.50%	Ad hoc; most recent January 1, 2008
Anne Arundel	No	2.5% x FAS x Credited Service Up to 20 yrs then 2% x FAS x Credited Service, Maximum: 70% x FAS	Base Pay	Highest 3 of last 5 yrs	20 years of credited service or Age 50 with 5 yrs	7.25%	60% CPI to a maximum of 2.5%
Baltimore City	No	Yrs 1-20 = 2.5% x FAS x Credited Service; Over 20 yrs = 2% x FAS x Credited Service	Base Pay	Highest 36 consecutive months	Age 55 with at least 15 years of credited service as a contributing member; or regardless of age, 25 years of credited service with at least 15 yrs as a contributing member	8% currently; 9% effective July 1, 2012; 10% effective July 1, 2013	Retiree who is not age 55 by June 30 will not receive an increase payable the following Jan.; Retiree age 55 to 65 will receive a 1% increase; Retiree age 65 or over will receive a 2% increase

Comparison of Retirement Programs of Various Governmental Jurisdictions Law Enforcement							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Baltimore	No	20 + YOS = 2.5% x FAS x Credited Service up to 20 yrs + 3% x FAS x Credited Service in excess of 25 yrs	Base Pay	Highest 12 full consecutive months	Age 60 with 10 years of credited service or 25 years of credited service without reference to age	8.5% effective 7/2011	0 if service < 5 yrs, 1- 3% based on CPI-U for the 12 months ending in Dec.
Calvert	Yes	Yrs 1-20 = 2.4% x FAS x Credited Service; Yrs 21-27 = 2% x FAS x Credited Service	Base Pay	Highest 3 of last 5	Age 55 or 25 years of credited service	8% of pay	3% or CPI - whichever is less
Carroll	Yes	% of FAS x yrs service: Yrs 1-15=1.9%; Yrs 16-25=2.2%; Yrs 26+ =2% (Max. 60%; Reduced formula for service prior to 10-01-09)	Base Pay	Highest 3 consecutive yrs	25 years of credited service or age 55 with 15 years	8%	Up to a maximum of 2%
Cecil	Yes	2% x Average Pay x 1st 25 years of Creditable Service	Base Pay	Highest 36 consecutive months	Age 55 with 5 years of credited service	8% of base pay	2% Cap

Comparison of Retirement Programs of Various Governmental Jurisdictions Law Enforcement							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Charles	Yes	Years 1 - 20 = 3% x FAS x Credited Service, Yrs 20+ = 2% x FAS x Credited Service	Base Pay	Highest 3 of last 5 yrs	25 yrs of credited service or age 60	8%	100% CPI up to a max of 4%
City of Frederick	Yes	22YP: 60% of Final Average Salary with twenty-two years of credited service, plus 1.5% x FAS x credited service in excess of 22 (effective 7/1/2012)	Base Pay	Highest 3 consecutive plan years out of the last 10 plan years	Effective 7/1/2012, age 62 with 5 years of credited service, age 63 with 4 years of credited service, age 64 with 3 years of credited service, or age 65 and older with 2 years of credited service	8%	Based on current CPI, limited to an annual increase of 2.5% of the member's benefit the previous year
Frederick	Yes	2.5% x FAS x Credited Service up to 20 yrs, 2% x FAS x Credited Service in excess of 20 to 28 yrs plus up to 2 years @ 2% for unused sick leave	Base Pay	Highest 36 consecutive months	Effective 7/1/2012, 25 years of credited service or age 55 w/5 years of credited service	9%	1% Compounded annually

Comparison of Retirement Programs of Various Governmental Jurisdictions Law Enforcement							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
City of Gaithersburg	Yes	Defined Contribution Plan with employer contributions of 8%; Plus Profit Sharing match of 3% on an Employee 5% contribution; Plus a Supplement of 5% as long as the member is contributing at least 5% each to the Profit Sharing Plan and the 457 Plan	Base Pay	N/A	5 year vesting on 8% and 3% match; 10 year vesting on 5% match	See plan formula	N/A
Garrett	Yes	2% x FAS x Credited Service not to exceed 30 years	Base Pay	36 consecutive calendar months out of most recent 120 months that = the highest average	Age 62	7.585%	Determined annually during budget deliberations

Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Comparison of Retirement Programs of Various Governmental Jurisdictions Law Enforcement							
Howard	Yes	% of FAS based on yrs of svc: 20 = 50%, 21 = 53%, 22 = 57%, 23 = 62%, 24 = 68%, 25 = 75%; max is 80% for yr 30 and over	Base Pay		20 years of credited service (or age 62 with 5 years if earlier)	11.6% of pay	100% CPI up to a maximum of 2%
MD-National Park/Planning Commission	No	60% of High-3 + 2% of High-3 for each yr in excess of 25 yrs	Base Pay	High-3	Age 55 w/ at least 5 years of credited service or 25 years of credited service	8% of base pay	Portion of member's benefit attributable to service earned after 7/1/12 will be subject to a maximum COLA of 2.5%.

Comparison of Retirement Programs of Various Governmental Jurisdictions Law Enforcement							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Montgomery	Yes	Police/Sheriff 2.4% x AFE x Credited Service	Base Pay + specific differentials; does not include overtime	Highest 36 months	Sheriff - 15 years of credited service and age 55 or 25 years and age 46; Police - 15 years of credited service and age 55 or 25 years and any age	Police/Sheriff - 6.75% employee contributions - 10.5% over SSWB	100% CPI for Washington Metro Area up to 3%; and 60% of any change in the CPI greater than 3%, not to exceed a total of 7.5%. The max 7.5% does not apply to disability retirees or retirees over age 65. Effective 7/1/2011, capped at 2.5% for benefits paid for service after June 30, 2011

Comparison of Retirement Programs of Various Governmental Jurisdictions Law Enforcement							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Prince George's	Police Officers- No Sheriffs- Yes	3% x FAS x 20 yrs; 2.5% x FAS x service credit over 20	Base Pay	Highest 24 consecutive months	20 years of credited service or Age 55	Police Officers - 8% Sheriff - 11%	$35 Guaranteed Annual Increase Funds must meet 8% return to provide for anything above $35. Maximum $135
St. Mary's	Yes	Sheriff's Office Retirement Plan - 2.5% of average pay multiplied by yrs of service	Base Pay	Average of the highest 36 months of base compensation	Age 62 or 25 years of credited service; whichever comes first.	8% of base pay	3% each July 1st
Washington	Yes	2% x Avg/Highest x Credited Service	Base Pay	Highest 3 yrs	25 years of credited service or age 50 with 5 years	6%	Not annual, determined during budget deliberations

Comparison of Retirement Programs of Various Governmental Jurisdictions Law Enforcement							
Jurisdiction	Social Security	Plan Formula	Earnings Include	Average Period for FAS	Normal Retirement Age	Employee Contributions	Cost of Living Increases
Wicomico	Yes	2% x FAS x Credited Service	Base Pay + Clothing allowance two times a year	Highest 36 consecutive months	5 years vested and 25 years of credited service in the plan or 5 years vested and Age 55, whichever comes first.	5.625%	Not annual, determined during budget deliberations
State System	Yes	2.0% x FAS x Credited Service	Base Pay	3 highest consecutive yrs; New hires after 7/1/2011 - 5 highest consecutive yrs	25 years of credited service or age 50	6% for FY 2012; 7% for FY 2013 and beyond	100% CPI up to max of 3%; All employees after 7/1/2011 - 100% CPI up to a max of 2.5% if rate of return is achieved; 1% if investment target not met